

DETAILED ACTION

EXAMINER'S AMENDMENT

An Examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it must be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with TAKASHI SAITO (Reg. # L0123; tel#202-756-8000) on 1 January 2010.

The application has been amended as follows:

1. Amend claim 1 as follows:

"A power system comprising: an electrochemical device; a load device; a power generator; and a charge/discharge controller of said electrochemical device,
said electrochemical device comprising a positive electrode, a negative electrode,
and a liquid electrolyte or a solid electrolyte,
said electrochemical device having a charge/discharge curve that has at least one
step, a given step of said at least one step having an inflection point, a voltage
corresponding to the inflection point or a point adjacent to the inflection point being set as
a threshold value, the inflection point existing greater than 0 % and less than 100% of a
remaining capacity,

said charge/discharge controller being configured to control charge/discharge of
said electrochemical device, and said power system further comprises a comparator that
compares the voltage of said electrochemical device with said threshold value, wherein

based on an output of said comparator, said charge/discharge controller causes said electrochemical device to be charged whenever the voltage is lower than said threshold value and causes said electrochemical device to be discharged whenever the voltage is higher than said threshold value so that the voltage of said electrochemical device approaches said threshold value;

wherein, when the voltage equals to the threshold value, said charge/discharge controller selects charging if the electrochemical device is being charged upon the output of the comparison result, and select discharging if the electrochemical device is being discharged upon the output of the comparison result”

2. Cancel claims 2 and 17.

3. Amend claim 16 as follows:

“A method for managing a power system that comprises an electrochemical device, a load device, and a power generator,

said electrochemical device comprising a positive electrode, a negative electrode, and a liquid electrolyte or a solid electrolyte,

said electrochemical device having a charge/discharge curve that has at least one step, a given step of said at least one step having an inflection point, a voltage corresponding to the inflection point or a point adjacent to the inflection point being set as a threshold value, the inflection point existing greater than 0 % and less than 100% of a remaining capacity, and

said method comprising controlling charge/discharge of said electrochemical device, wherein said controlling charge/discharge comprises the steps of:

measuring a voltage of said electrochemical device;
comparing the measured voltage with said threshold value;
based on a result of the comparing, charging said electrochemical device whenever the measured voltage is lower than said threshold value and discharging said electrochemical device whenever the measured voltage is higher than said threshold value such that the voltage of said electrochemical device approaches said threshold value, and wherein said controlling charge/discharge further comprises the steps of:
when the measured voltage equals to said threshold value, charging said electrochemical device if the electrochemical device is being charged upon the measuring the voltage, and discharging the electrochemical device if the electrochemical device is being discharged upon the measuring the voltage.”

Reasons for Allowance

Claims 1 and 16 are allowed. The following is the examiner's statement for allowance." The prior art does not disclose or suggest the following: The prior art does not disclose or suggest the following: "**when the measured voltage equals to said threshold value, charging said electrochemical device if the electrochemical device is being charged upon the measuring the voltage, and discharging the electrochemical device if the electrochemical device is being discharged upon the measuring the voltage”** in combination with the remaining limitations of independent claims 1 and 16. Dependant claims 3, 6-15 and 18-22 are allowable for the same reason.

The examiner found YAMAMOTO (US 4,883,724) and TSUJINO (US 5,180,961) to be the closest prior art to the claimed invention. YAMAMOTO discloses a control unit for as fuel cell generation system in which a fuel cell is used to provide power to a load and also to charge a battery which has inflection point, the battery is charged up to a predetermined point (i.e. more than 80% of battery capacity), when the battery reaches that threshold value the battery stops receiving charging power and is discharged as the load requirement increases.

TSUJINO discloses a battery charging apparatus such that battery charging is controlled to stop when the battery is fully charged such charging is detected by monitoring the charging characteristics of the battery and full charge is indicated once the rate of change of voltage is less than a certain value (i.e. inflection point is received). However neither reference nor their combination suggests the above missing limitation, and it would not have been obvious to one of ordinary skill in the art at the time of the invention to modify any of the references in view of the other or any other additional references in order to meet the above missing limitations.

Conclusion

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ahmed Omar whose telephone number (571)270-7165. The examiner can normally be reached between 7:00 am-4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Assouad can be reached on 571-272-2210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/AHMED OMAR/
Examiner, Art Unit 2858